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# **Fiscal Sustainability: a note for Cabo Verde**

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## **Summary**

The present note aims to analyze the sustainability of the fiscal policies adopted by the government of Cabo Verde in the last two decades (1990-2013). We used time series techniques to derive our results. We tested the debt sustainability under two case scenarios by using the potential cointegration between the government expenditures and revenues (revenue with or without donations from international partners). The results from our data show that the fiscal policies adopted recently can be assumed to be sustainable only in the first scenario, when foreign donations are considered. If we exclude foreign donations from the government revenues, the hypothesis of non-sustainability cannot be rejected. These results show that fiscal reforms are needed to supplant the great dependence from Donors.

JEL Classification: C22, H60.

Keywords: Fiscal sustainability, intertemporal budget constraints, cointegration.

## 1. Introduction

Cabo Verde is an archipelago containing 10 small islands with a population of about half a million people. The lack of natural resources and the great dependence from the international scenario imposes serious restrictions on the way that financial resources may be used.

Since 2004 the national agenda for economic transformation has been operationalized by three Growth and Poverty Reduction Strategic Paper "*Documento de Estratégia de Crescimento e Redução da Pobreza*" (DECRPs). The growth and poverty reduction strategies (GPRS) are based on five pillars, namely (1) promoting good governance, strengthening effectiveness and ensuring equity (2) developing and enhancing human capital (3) promoting competitiveness to boost economic growth and employment creation (4) improving and development basic infrastructure, including transportation and communication, the energy sector, and the management of hydraulic resources, and finally (5) improving the social protection system.

Cabo Verde has achieved a great economic development, and these improvements are widely recognized by the international partners. At national level, the poverty rate had the following trend: 49% in 1988/89, 37% in 2001/2002, 26.6% in 2007 and 25% in 2011. From the Independence, the social economic progress achieved by Cabo Verde has been led by the long-term national development vision. This vision have been established and implemented by different governments since the national independence in 1975. Between 1982 and 1995 there were three national development plans (I National Development Plan -1982/1985; II National Development Plan - 1986/1990; III National Development Plan- 1992/1995). Between 1997 and 2000, the government published the document named the Great Plan Options 1997/2000 "*As grandes opções do Plano 1997/2000*", and in 2001, the new elected government, published the Great Plan Options - an strategic agenda 2002-2005 "*As grandes opções do Plano uma agenda estratégica 2002/2005*".

These economic realizations were only possible due two aspects, namely the public policies adopted and the good international partnerships. All these social and economic achievements came with a price - the public debt has increased during the years. In order to promote a more inclusive development

among the islands, dams, roads, airports, and bridges were some of the built infrastructures in recent years. As we know, there is no “free lunch” - all these investments (and many more institutional reforms) were financed through grants, debts and fiscal revenues. However, in 2008 Cabo Verde was graduated from the group of Least Developed Countries (LDCs) to the group of Middle Income Countries (MICs), and therefore donations from the international partners are expected to decrease in the subsequent years. In such scenario, the government must start a fiscal reform in order to decrease the debt-GDP ratio and improve the creditor’s confidence in the country’s future performance.

In the last months there has been an increasing media divulgation on the current public-debt situation of the government. According to projection from the Ministry of finance, the general government debt is expected to reach 98% of the GDP in 2014, (it was 92% and 85% in 2013 and 2012 respectively). The government has claimed that this increase is related to the investment program implemented to build the major infrastructures in the country, and argued further that a big share of these loans is concessional and therefore the implicit costs are relatively low.

Despite the great concern of politicians and the general public on the issue of fiscal sustainability, there seem to be very little empirical work that tries to analyze this subject in a more technical or empirical way<sup>1</sup>.

The present note aims to fill this gap. In this paper, we conduct a formal test of whether Cabo Verdean’s fiscal policy has been sustainable during the last two decades. In particular, we want to evaluate the consistency of the fiscal policy with the assumption of intertemporal budget balance. In the literature on debt sustainability, General equilibrium and econometrics models are suitable – we opted to use the second approach.

Beyond this introduction, this paper is organized as follows. In section 2 a brief formal about the meaning of sustainability as used in this paper. The data used, the econometric methodology, and the results are briefly outlined in section 3. The final remarks are presented in section 4.

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<sup>1</sup> Mu (2013) used a general equilibrium model to study the various possible scenario for the Cape Verdean-government debt. Our approach is different – we decided to use time series techniques to derive our results.

## 2. Criteria for sustainability

To test the sustainability of the fiscal policies we used as a basic framework the work developed by Hakkio and Rush (1991).

The government's budget constraint, for one period, can be written as:

$$G_t + (1 + r_t)B_t = R_t + B_t \quad (1)$$

Where  $G$  represents the government purchases of goods and services (excluding the interest payments on debts).  $B$  is the real market value of the debt held by the public.  $r$  represents the ex-post real interest rate.  $R$  represents the real government revenues. However, as stressed by Rocha (1997) money seigniorage can be included as revenue. On the other hand, as highlighted by Sarr (2005), for developing countries, the donations from the international partners or other governments can also be included as revenues, in the sense that it can also be used as a source for government expenditure.

Utilizing assumptions as given in Flavin and Hamilton (1986), the presentation here follows Olekalns and Cashin (1999):

$$\lim_{s \rightarrow \infty} (1 + r)^{-s} B_{t+s} = 0 \quad (2)$$

Equation (2) states the non-ponzi game condition. This condition rules out the possibility that the government's expenditure can be financed by a ponzi mechanism (the government cannot issue new debts to pay old maturing debt).

Given equation (2), if equation (1) is solved forward, we have the following results:

$$G_t^* - R_t = \sum_{s=0}^{\infty} (1 + r)^{-s+1} (\Delta R_{t+s}) - \Delta G_t^* + r \Delta B_{t+s-1} \quad (3)$$

According to Olekalns and Cashin (1999), equation (3) imposes some restrictions on the time series structure of the revenues and expenditures.

In order to test empirically the fiscal sustainability we follow the suggestion from the work of Hakkio and Rush (1991). According to these authors, we can analyze the sustainability of the fiscal policies by verifying the following equation (the cointegration regression):

$$R_t = \mu + \beta G_t^* + e_t \quad (4)$$

Where  $G^*$  represents the government's expenditure (inclusive of interest payments on the debt).

As highlighted by the authors, the fiscal policies are sustainable if the government revenues ( $R$ ) and the expenditure ( $G^*$ ) are cointegrated. However, the cointegration between these variables is not sufficient to guarantee that the intertemporal budget constraint holds. However, as pointed out by Arároz et al. (2007), if these two variables are cointegrated, the deficit can be strongly or weakly sustainable depending on the cointegration parameter: if  $\beta=1$  we can say that the fiscal policy is strongly sustainable, but if  $0<\beta<1$  we say that the fiscal policies is weakly sustainable. Hence, weak sustainability would mean that the government expenditure would be always larger than the revenue, and therefore the discounted value of the debt would become unbounded – in such case, it is less likely the government would be able to finance its deficit through the market.

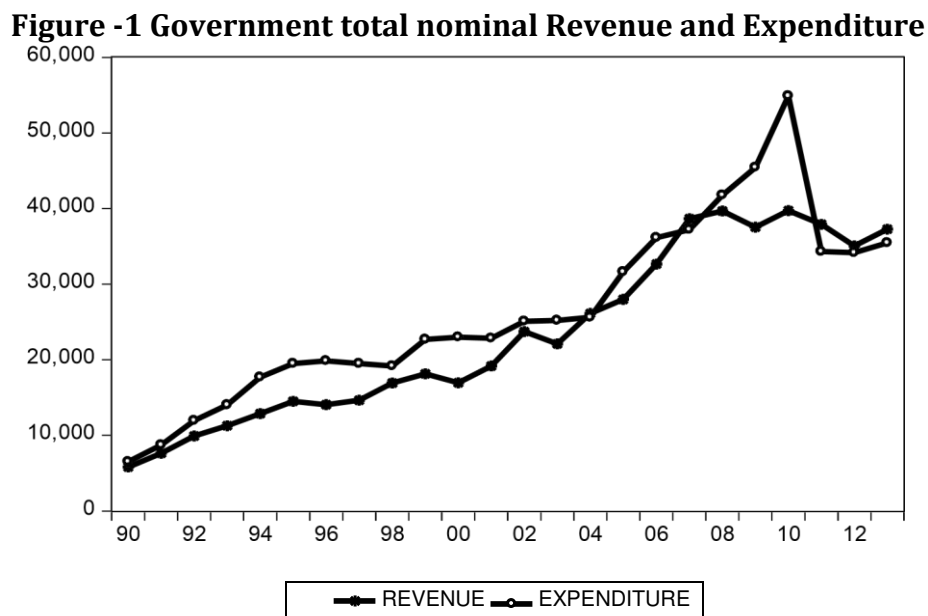
## **2.1. Data and Econometric Methodology**

The data used in this paper were collected at the Central Bank of Cape Verde. We used the annual data presented at the account named “Gross Operational Results” from the government accounting. We used nominal values (at national currency) of total revenue, total expenditure and total donations received from the partners. Given data issues, we were able to cover the period of 1990 until 2013.

The methods used to derive our results are based on time series techniques. To check for stationarity, we used the most common test used in empirical works, namely Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test. In order to perform the cointegration test, we used the Engle-Granger test.

Given that two variables are cointegrated we used two methods to obtain the cointegration regression, namely the Static OLS (SOLS) and the Fully Modified OLS (FMOLS) methods. We used the Software *Eviews* version 8.

Figure (1) presents the time series of the total revenues and expenditure.



According to figure (1), expenditure and revenues have been increasing during the last two decades. A look at the figures seems to reveal that there is a structural brake in the expenditure - from year 2009 to 2010. Although there is a similar time-series trajectory for both variables, we must perform more specific tests to verify the long-run relationship between these two variables. The results from the tests are presented in the following tables: first, we tested the stationarity of the series.

In order to test for unit root, given the structure of the series, we tested different models (with or without intercept and with or without trend - we display

here the best model). PP-tests are not displayed here since the decisions on the null hypothesis remain the same.

**Table-1: Augmented Dickey-Fuller Test (level)**

Estatística Dickey-Fuller (ADF)	Revenue*	Expenditure
Augmented Dickey-Fuller test statistic	-1.87	-2.40
P-value**	0.63	0.36

Note: \*\* Null hypothesis: there is a unit root in the time series.

\* The revenue includes the amount of donations received. We used the PP test but there is no change in our decision on the null - expenditure (P-value = 0.45); revenues (Pvalue = 0.74).

**Table -2: Augmented Dickey-Fuller Test (first difference)**

Estatística Dickey-Fuller (ADF)	Revenue	Expenditure
Augmented Dickey-Fuller test statistic	-4.17	-5.34
P-value	0.017	0.001

Note: Null hypothesis: there is a unit root in the time series. We used the PP test but there is no change in our decision on the null.

Our first results on Dick-fuller test reject the hypothesis of stationarity in level. However, the null hypothesis is rejected when we look at the first difference. Thus, these two variables are I(1). Given that they are I(1) we first tested for cointegration by using Engle-Granger's residual based test. The results are presented in the following tables.



**Table -3: Engle-Granger's residual Cointegration test**

Dependent Variable	Tau-statistic
Revenue	-3.56 (p-value=0.055)
Expenditure	-3.99 (p-value=0.023)

Note: Null hypothesis: the variables are not cointegrated.

The results confirm that the two variables (revenues and expenditures) are cointegrated. The p-values presented in brackets confirm that at normal significance level the null can be rejected. Thus, according with our results the fiscal policies of the government in the two decades has been sustainable – in the sense that the intertemporal budget constraint is not violated.

In the light of the literature we can check if the fiscal policy was weakly or strongly sustainable in these two decades. In this case our aim is to obtain the cointegration vector. We used two different methods to estimate the cointegration regression (equation 4), namely we used the Static OLS (SOLS), and the Fully Modified OLS (FMOLS) methods. The results are presented in the following chart.

**Table -4: Test for type of Fiscal Sustainability**

Cointegration Vector	SOLS**	FMOLS
$(1 - \beta)$	(1 -0.91)	(1.0 -0.98)
Wald Test* (t- statistic and Chi- square p-value)	t-stat (p-value)= 0.18 $\chi^2$ (p-value)= 0.17	t-stat (p-value)= 0.89 $\chi^2$ (p-value)= 0.88
Type of sustainability	Strong	Strong

Notes: \* Null hypothesis: the cointegrating regressor coefficient is equal to 1 (according with literature this would be the case of strong sustainability).

\*\* If the series are cointegrated we know that the SOLS method gives “super-consistent” estimates. However, given that the estimates have a asymptotic distribution that is not Gaussian, traditional testing procedure are not recommended.

We use the Wald statistical test to verify if the cointegrating vector is statistically equal to: (1.0 -1.0) – that is, we would like to know if the cointegrating regressor coefficient is statically equal to one (the null hypothesis). According with the results from the test:  $t$ -statistic  $p$ -value (=0.89) and Chi-square  $p$ -value (=0.88), we fail to reject the null hypothesis. In this case we claim that the fiscal policies implemented by the government of Cabo Verde, during these two decades, have been **strongly sustainable**.

In the results presented above, we included in the revenues all the donations received by the government. However, given the new status of Cabo Verde (included in the group of MICs) the amount of donations is expected to decrease in the following years. Therefore, is important to verify if the fiscal policy remains sustainable if donations are not included in the revenues.

The results on the stationarity test are summarized in the following table.

<b>Table-5: Dickey-Fuller Test (Revenues excluding donation)</b>		
Estatística Dickey-Fuller (ADF)	Revenue* (level)	Revenue (1 <sup>a</sup> difference)
Augmented Dickey-Fuller test statistic	-0.44	-3.88
P-value**	0.88	0.008

Note: \*\* Null hypothesis: there is a unit root in the time series.

\* We also used the intercept and trend specification but the decision on the null hypothesis remains the same.

The results on level indicate that the unity root hypothesis cannot be rejected at the 10% significance. However, in the first difference, the null hypothesis can be rejected. Therefore, the government's revenue (excluding donations) remains I(1).

Given the results on tables above, we can test if the new revenue (excluding donations) and the government expenditure are cointegrated. The results are summarized in the following tables.

**Table -6: Engle-Granger's residual Cointegration test**

Dependent Variable	Tau-statistic
Revenue	-1.39 (p-value=0.82)
Expenditure	-1.81(p-value=0.65)

Note: Null hypothesis: the Variables are not cointegrated.

The results indicate that the two variables are not cointegrated (we fail to reject the null hypothesis at 5% significance), which means that the fiscal policies used in the last two decades are not sustainable if we exclude donations from the government revenues.

#### **4. Final Remarks**

The present note aimed to analyze the fiscal sustainability in Cabo Verde Verde during the last two decades. We used time series approaches to perform our study. The results show that the donation from the international partners has been an important source of revenues for the Cabo Verde. We found that if we exclude the donations from the government's revenues, the fiscal policies are unsustainable. On the other hand, the results show evidence that the fiscal policies are sustainable if donations are included in the revenues. These results highlights that fiscal reforms are crucial for Cabo Verde in the followings years.

Despite our results, we must highlight some restrictions on the methods we used here. First, in the presence of structural breaks, the methods of ADF and PP have their power reduced – in this case, the Zivot and Andrews (1992) test is suitable. Second, according with the literature, there is a set of different empirical ways to perform the sustainability test (econometric and simulation models are available in the empirical literature). Finally, we must highlight that the results presented here depends of the data we used – different dataset may create different results.

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